

STATE OF CLAIMS

Claims 1-27 are pending and at issue in the application with claims 1 and 16 being independent claims. The Examiner has rejected claims 1-27.

REMARKS

The Examiner has rejected claims 1, 3, 5, 7, 11-12, 16-17, 19, 21, 23 and 27 under 35 U.S.C. §102(e) as being anticipated by Day et al. (U.S. Patent No. 6,393,184). With respect to claims 1 and 16, the Examiner states that Day teaches an apparatus and method for optically connected circuit boards, where the first and second boards are adjacent to each other, a light source coupled to the first circuit board, a photodetector coupled to the second circuit board, and the second board is arranged with respect to the first board such that the photo detector receives the optical signals from the light source.

Further, the Examiner has rejected claims 1, 3-7, 11-12, 14, 16, 17, 19-23 and 27 under 35 U.S.C. §102(e) as being anticipated by Yoshimura et al. (U.S. Patent No. 6,343,171). With respect to claims 1 and 16, the Examiner states that Yoshimura teaches an apparatus and method for optically connected circuit boards, where the first and second boards are adjacent to each other, a light source on one board and a photodetector on another board, and the boards arranged such that the detector receives the light from the light source.

Still further, the Examiner has rejected claims 2, 8, 9, 10, 13, 15, 18 and 24-26 under 35 U.S.C. §103(a) as being unpatentable over Day et al. and Yoshimura et al. in view of Husain (U.S. Patent No. 6,453,083), Park et al. (U.S. Patent No. 5,770,851) and Jewell et al. (U.S. Patent No. 6,421,474).

With respect to claims 9 and 25, the Examiner states that while Day does not specifically disclose light pipes made of plastic, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a cylindrical, plastic light pipe. With respect to claim 13, the Examiner states that even though Day does not specifically disclose light pipes that include lenses, it would have been obvious to one of ordinary skill in the art to use a lens to perform

the desired function of properly coupling the optical signal from the light source to the light pipe.

With respect to claims 2 and 18, the Examiner states that while Day does not utilize free space as the optical transport medium, Park teaches the use of free space as a simpler option since additional wave guides do not need to be fabricated and assembled. Further, the Examiner states that it would have been obvious to one skilled in the art to transmit light over free space since it is simpler to implement and is a well-known function equivalent to the use of another optical medium.

With respect to claims 10 and 26, the Examiner states that while Day does not teach the electrical interconnection between circuit boards, Yoshimura teaches electrical interconnection between opto-electronic circuit boards. Further, the Examiner notes that it would have been obvious to one skilled in the art to have electrical interconnections between circuit boards in order to provide electrical power, ground and signals to the circuit board while providing structural support for stability.

With respect to claims 8, 15 and 24, the Examiner states that while Yoshimura does not disclose the use of lenses to focus the light from a light source or collect light for a photodetector, Jewell teaches the use of a lens in order to focus light into and out of a waveguide.

Response to the Rejections Under 35 U.S.C. §102

Applicant respectfully traverses the rejection of claims 1, 3, 5, 7, 11-12, 16-17, 19, 21, 23 and 27 under 35 U.S.C. §102(e) as being anticipated by Day et al. (U.S. Patent No. 6,393,184). Further, applicant respectfully traverses the rejection of claims 1, 3-7, 11-12, 14, 16, 17, 19-23 and 27 under 35 U.S.C. §102(e) as being anticipated by Yoshimura et al. (U.S. Patent No. 6,343,171).

Reconsideration and withdrawal of the rejections in light of the following remarks are respectfully requested.

Each of claims 1-27, as amended, recite an apparatus for an optical interconnection apparatus having a first circuit board, a second circuit board

parallel to the first circuit board, where the first and second circuit boards are arranged with respect to each other such that the first circuit board is oriented above the second circuit board, a light source coupled to the first circuit board, the light source being adapted to transmit an optical signal, a photo detector coupled to the second circuit board, wherein the second circuit board and the first circuit board are arranged with respect to each other such that the photo detector receives the optical signal over an optical transport medium

Briefly, Day discloses a method and apparatus for connecting two or more electrical circuit boards using optical components. Further, Yoshimura is directed to special-purpose opto-electronic substrates that may be used to connect digital and/or analog electrical systems. More specifically, Yoshimura relates to special-purpose opto-electronic substrates that have both electrical and optical interconnections.

Neither Day nor Yoshimura disclose or suggest an apparatus for opto-electric connections comprising a first and second circuit board, where the second circuit board is parallel to the first circuit board and where the first and second circuit boards are arranged with respect to each other such that the first circuit board is oriented above the second circuit board. The Examiner states in his office action that Day teaches that the mounting surfaces on both circuit boards are parallel. There is insufficient guidance in Day to support this claim. And, it is unclear from the figures in Day that the mounting surfaces are parallel. Nonetheless, Day provides no suggestion or motivation that the printed circuit boards are arranged with respect to each other such that the first circuit board is oriented above the second circuit board.

Yoshimura is directed to special-purpose, opto-electronic substrates and not printed circuit boards. More specifically, in order for the optical devices of Yoshimura to be optically coupled to one another, an opto-electronic interposer or OE film must be inserted between the optical devices to provide an optical connection. This is dissimilar to the present invention as the means for creating an optical coupling between the printed circuit boards is integrated onto each circuit board and do not require any additional insertions of other devices or special-purpose films.

Because neither Day nor Yoshimura discloses or suggests a method and apparatus for an optical interconnection apparatus having first and second circuit boards, where the first and second circuit boards are parallel to one another and one circuit board is mounted above the other circuit board as recited by claims 1-27, it follows that Day and Yoshimura taken individually or in combination do not anticipate or render obvious any of claims 1-27.

Response to the Rejections Under 35 U.S.C. §103

Applicant respectfully traverses the rejection of claims 2, 8, 9, 10, 13, 15, 18 and 24-26 under 35 U.S.C. §103(a) as being unpatentable over Day et al. and Yoshimura et al. in view of Husain (U.S. Patent No. 6,453,083), Park et al. (U.S. Patent No. 5,770,851) and Jewell et al. (U.S. Patent No. 6,421,474).

Reconsideration and withdrawal of the rejections in light of the following remarks are respectfully requested.

Claims 9 and 27 of the present invention are directed to a light pipe which is comprised of a transparent filter made of plastic. The Examiner has suggested it would be obvious to one of ordinary skill in the art at the time of the invention to use a cylindrical plastic light pipe. The Examiner further states that cylindrical plastic light pipes are easily formed and cheap because they are made of plastic. However, Day does not specifically disclose that the light pipes disclosed therein are made of plastic. Additionally, Day provides no suggestion that the light pipes disclosed therein can be made from plastic. Because a particular material is common and cheap it does not necessarily translate that the use of that material in a particular application is obvious.

Claim 13 is directed to a light pipe which includes a lens that is designed to focus light from the light source. The Examiner states that while Day does not specifically disclose light pipes that include lenses, Husain discloses in Figs. 9B and 10A, the use of lenses formed on the light pipe. Further, the Examiner states that it would have been obvious to one of ordinary skill in the art to use a lens to perform the desired function of partially coupling the optical signal from the light source to the light pipe. While Husain discloses the use of lenses formed on the

light pipe, such use is neither disclosed nor suggested to optically connect printed circuit boards as claimed in the present invention.

Claims 2 and 18 are directed to using free space as an optical transport medium. The Examiner argues that while Day does not utilize free space as the optical transport media, Park teaches the use of free space as a simpler option since additional wave guides do not need to be fabricated or assembled. Further, the Examiner states that it would have been obvious to one of ordinary skill in the art to transmit light over free space since it is simpler to implement and is a well-known functional equivalent to the use of another optical medium such as a wave guide. While Park discloses the use of free space as the optical transport media, Park neither discloses or suggest the use of free space as the optical transport media to optically connect printed circuit boards.

Claims 10 and 26 are directed to an electrical connector used to connect circuit boards. The Examiner argues that while Day does not teach the electrical connection between circuit boards, Yoshimura teaches electrical interconnection between circuit boards. Further, the Examiner states that it would have been obvious to one of ordinary skill in the art to have electrical connections between circuit boards. While Yoshimura discloses electrical interconnections, Yoshimura neither discloses or suggest the use of electrical interconnections to electrically connect printed circuit boards. As in Park, Yoshimura is directed to special-purpose opto-electronic substrates.

Claims 8, 15 and 24 are directed to the use of lenses to focus the light from a light source or collect light for a photodetector. The Examiner argues that while Yoshimura does not teach to the use of lenses to focus the light from a light source or collect light for a photodetector, Jewell discloses the use of a lens in order to focus light into and out of a waveguide. While Jewell discloses the use of a lens in order to focus light into and out of a waveguide, Jewell neither discloses or suggest the use of a lens in order to focus light into and out of a waveguide mounted on printed circuit boards. Jewell is directed to wafer scale opto-electronics.

With reference to the Examiner's arguments, there is no disclosure or suggestion in any of the cited art that it would be desirable or even possible to provide the apparatus specified by the present invention. Because neither Day et

al., Yoshimura et al., Husain, Park et al. nor Jewell et al. discloses or suggests the present invention as recited in amended claims 1-27, it follows that none of the cited art taken individually or in combination anticipates or renders obvious any of amended claims 1-27.

CONCLUSION

Applicant respectfully requests reconsideration of the application in view of the foregoing remarks and early issuance of a Notice of Allowance covering all claims in the application. Should the Examiner have any questions regarding this application, he is invited to contact Applicant's attorney at the telephone number below.

Respectfully submitted,



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